CLAIMS:

1. A catalyst precursor composition represented by the formula:

$$G_gA_nM_mL_p$$

wherein M is a metal from Groups 1 to 15 and the Lanthanide series of the Periodic Table of the Elements;

g is an integer equal to or greater than 1;

m is an integer equal to or greater than 2;

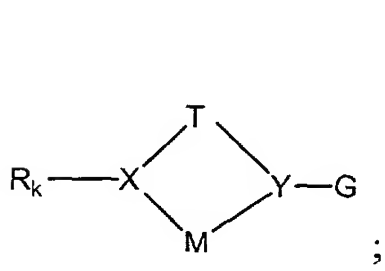
each L is a monovalent, bivalent, or trivalent anionic ligand;

p is an integer equal to or greater than 1;

n is an integer equal to or greater than 2;

G is a spacing group that is capable of bonding to at least two A substituents; and

at least one A is selected from the following catalytically active ligands:



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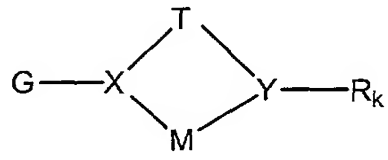

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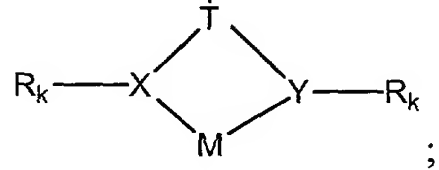

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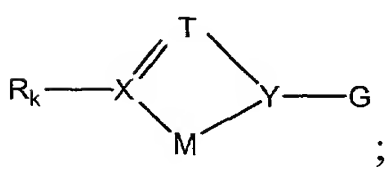

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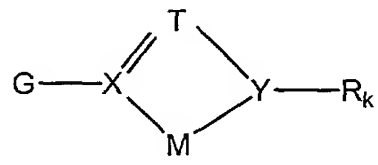

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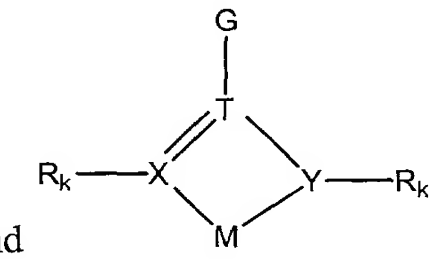


wherein T is a bridging group containing 2 or more bridging atoms;

R is selected from bulky and non-bulky substituents with respect to X, Y, or both X and Y, and

k is an integer that will vary to satisfy the oxidation state of but will range from about 1 to 3.

2. The catalyst precursor composition of claim 1 wherein each L is independently a monovalent, bivalent, or trivalent anionic ligand containing from about 1 to 50 non-hydrogen atoms, and is independently selected from the group consisting of halogen containing groups; hydrogen; alkyl; aryl; alkenyl; alkylaryl; arylalkyl; hydrocarboxy; amides, phosphides; sulfides; silyalkyls; diketones; borohydrides; and carboxylates.

3. The catalyst precursor composition of claim 2 wherein each L is independently selected from alkyl, arylalkyl, and halogen containing groups and contains from about 1 to 20 non-hydrogen atoms.

4. The catalyst precursor composition of claim 1 wherein G is selected from alkyl, alkenyl, cycloalkyl, heterocyclic (both heteroalkyl and heteroaryl), alkylaryl, arylalkyl.

5. The catalyst precursor composition of claim 4 wherein G contains from about 1 to 20 non-hydrogen atoms.

6. The catalyst precursor composition of claim 1 wherein G contains from about 1 to 50 non-hydrogen atoms.

7. The catalyst precursor composition of claim 1 wherein R is a non-bulky substituent that has relatively low steric hindrance with respect to X or Y and is selected from the group consisting of straight and branched chain alkyl groups.

8. The catalyst precursor composition of claim 7 wherein R is a C_1 to C_{30} alkyl group.

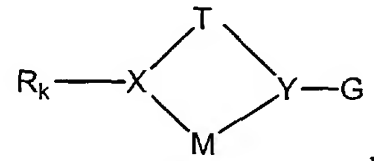
9. The catalyst precursor composition of claim 8 wherein R is a C_1 to C_{20} alkyl group.

10. The catalyst precursor composition of claim 1 wherein R is a bulky substituent with respect to X or Y and is selected from alkyl, alkenyl, cycloalkyl, heterocyclic, alkylaryl, arylalkyl, polymeric, and inorganic ring structures.

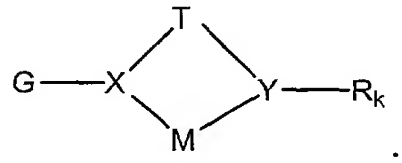
11. The catalyst precursor composition of claim 10 wherein R is a bulky substituent and contains 3 to 30 non-hydrogen atoms.

12. The catalyst precursor composition of claim 1 wherein M is selected from Groups 3 to 7 of the Periodic Table of the Elements.

13. The catalyst precursor composition of claim 1 wherein A is represented by:



14. The catalyst precursor of claim 1 wherein A is represented by:



15. A catalyst composition comprising:

a) a catalyst precursor composition represented by the formula:

$$G_gA_nM_mL_p$$

wherein M is a metal from Groups 1 to 15 and the Lanthanide series of the Periodic Table of the Elements;

g is an integer equal to or greater than 1;

m is an integer equal to or greater than 2;

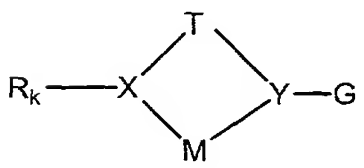
each L is a monovalent, bivalent, or trivalent anionic ligand;

p is an integer equal to or greater than 1;

n is an integer equal to or greater than 2;

G is a spacing group that is capable of bonding to at least two A substituents; and

at least one A is selected from the following catalytically active ligands:



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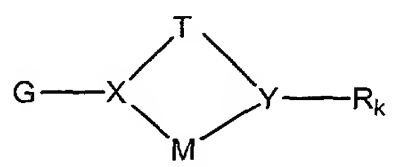

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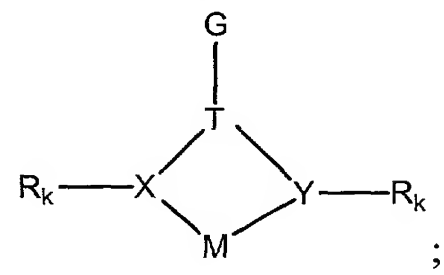

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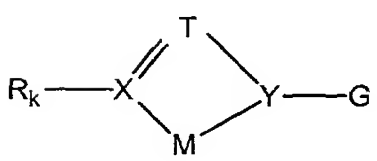

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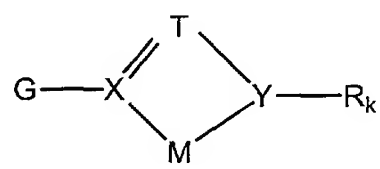

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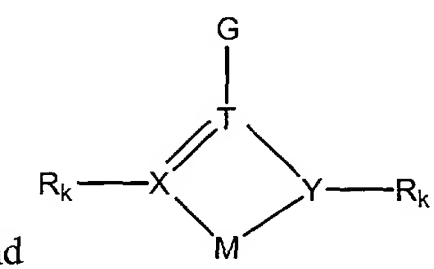


wherein T is a bridging group containing 2 or more bridging atoms;

R is selected from bulky and non-bulky substituents with respect to X, Y, or both X and Y; and

k is an integer that will vary to satisfy the oxidation state of but will range from about 1 to 3.

16. The catalyst composition of claim 15 wherein T is selected from:
wherein the X and Y substituents are included for convenience.

17. The catalyst composition of claim 15 wherein each L is independently a monovalent, bivalent, or trivalent anionic ligand containing from about 1 to 50 non-hydrogen atoms, and is independently selected from the group consisting of halogen containing groups; hydrogen; alkyl; aryl; alkenyl; alkylaryl; arylalkyl; hydrocarboxy; amides, phosphides; sulfides; silyalkyls; diketones; borohydrides; and carboxylates.

18. The catalyst composition of claim 17 wherein each L is independently selected from alkyl, arylalkyl, and halogen containing groups and contains from about 1 to 20 non-hydrogen atoms.

19. The catalyst composition of claim 15 wherein G is selected from alkyl, alkenyl, cycloalkyl, heterocyclic (both heteroalkyl and heteroaryl), alkylaryl, arylalkyl.

20. The catalyst composition of claim 19 wherein G contains from about 1 to 50 non-hydrogen atoms.

21. The catalyst composition of claim 15 wherein R is a non-bulky substituent that has relatively low steric hindrance with respect to X or Y and is selected from the group consisting of straight and branched chain alkyl groups.

22. The catalyst composition of claim 21 wherein R is a C_1 to C_{30} alkyl group.

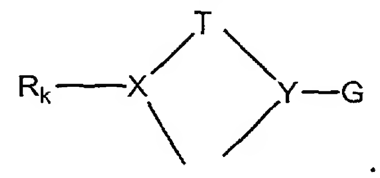
23. The catalyst composition of claim 22 wherein R is a C_1 to C_{20} alkyl group.

24. The catalyst composition of claim 15 wherein R is a bulky substituent with respect to X or Y and is selected from alkyl, alkenyl, cycloalkyl, heterocyclic, alkylaryl, arylalkyl, polymeric, and inorganic ring structures.

25. The catalyst composition of claim 24 wherein R is a bulky substituent and contains 3 to 30 non-hydrogen atoms.

26. The catalyst composition of claim 15 wherein M is selected from Groups 3 to 7 of the Periodic Table of the Elements.

27. The catalyst composition of claim 15 wherein A is represented by:



28. The catalyst composition of claim 16 wherein A is represented by: